
Rule WLM665: Too many synchronous requests were changed to asynchronous requests

Finding: An unacceptably large number of synchronous requests were changed to asynchronous requests.

Impact: This finding can have a MEDIUM IMPACT, or HIGH IMPACT on the signalling performance of the sysplex.

Logic flow: This a basic finding. There are no predecessor rules.

Discussion: Signalling requests to a coupling facility can occur only if a subchannel to the coupling facility is available. If no subchannel is available, the cross-system extended services (XES) will either enter a CPU "spin loop" waiting for a subchannel to become available or queue the request until a subchannel is available. The type of action taken by XES depends on whether the request was specified as synchronous or asynchronous.

- Synchronous requests require that a response be received from the coupling facility before the requesting application continues execution. Synchronous requests would be used, for example, to request a lock. In this example, the application cannot proceed until the lock is granted.

For synchronous requests, XES will either (1) satisfy the request if a subchannel is available, (2) enter CPU "spin-looping" until a subchannel is available and the request is satisfied, or (3) convert the synchronous request to an asynchronous request if the type of request permits the conversion.

- Asynchronous requests allow the requesting application to continue processing and be notified when the request is completed. For asynchronous requests, XES either starts or queues the request and returns control to the application issuing the request.
- Some requests can be issued as synchronous but will be converted to asynchronous if the subchannels are busy¹ unless the application has indicated that the synchronous cannot be converted.

¹The application can specify which requests must be satisfied as synchronous and which can be converted to asynchronous. XES will automatically convert requests from synchronous to asynchronous if all signalling paths are busy, unless the application specifies that the conversion is not to be done.

There is a significant overhead associated with changing synchronous requests to asynchronous requests. XES must initially detect that the synchronous request is not going to be satisfied, the request must be changed to asynchronous, the request is queued, XES must detect when a subchannel is available, de-queue the asynchronous request, and process the asynchronous request. Not only is this overhead expensive in terms of resource consumption, but it is expensive in terms of delay to the application issuing the synchronous request.

The number of synchronous requests changed to asynchronous should be very low, to minimize the overhead and the delay to applications. IBM suggests that action should be taken when more than 10% of the synchronous requests are changed to asynchronous requests. This percentage is, obviously, dependent upon the application and the importance of the requests.

CPEXpert computes the percent of synchronous requests changed to asynchronous requests (R744SSTA/R744SSRC). CPEXpert produces Rule WLM665 when this percent is greater than the SYNCCHG guidance variable.

The default value for the SYNCCHG guidance variable is 10, indicating that CPEXpert should produce Rule WLM665 when more than 10% of the synchronous requests are changed to asynchronous requests.

The following example illustrates the output from Rule WLM665:

RULE WLM665: TOO MANY SYNCHRONOUS REQUESTS WERE CHANGED TO ASYNCHRONOUS

DB2DBP2_GBP3: The structure experienced too many requests being changed from synchronous to asynchronous. If MVS determines that a synchronous request will be significantly delayed (perhaps because subchannels are busy), MVS will change the request to an asynchronous request (note that synchronous lock requests are not changed). This finding could indicate that you need additional coupling facility links.

MEASUREMENT INTERVAL	TOTAL SYNC REQUESTS	SYNCH REQUESTS CHANGED TO ASYNCH	PERCENT CHANGED
7:15- 7:30,03OCT1996	242	29	12.0

Suggestion: Changed requests normally are caused by subchannel unavailable conditions. CPEXpert suggests that you consider the following alternatives if Rule WLM665 is produced:

- You should make certain that sufficient CPU resources have been allocated to the coupling facility LPAR.

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- You should consider whether additional coupling facility links should be added between the MVS processor the coupling facility. Each coupling facility link will contribute two subchannels.
 - You should examine whether the structure activity is balanced between coupling facilities. You may wish to consider redistributing the structures among the coupling facilities if a significant imbalance exists.
 - If possible, you should consider influencing the exploiters of the coupling facilities to lower the activity rate to the coupling facilities. Taking other tuning actions (especially if indicated by other rules produced by CPExpert) may reduce the number of XCF signals. For example, signal activity can be lowered by (1) reducing lock contention, (2) reducing false lock contention, or (3) tuning the XCF to eliminate signals related to the expansion of a transport class size.

If none of the above alternatives are appealing, you may wish to change the guidance to CPExpert by altering the **SYNCCHG** guidance variable in USOURCE(WLMGUIDE).

Reference: Washington System Center Flash 9609 ("CF Reporting Enhancements to RMF 5.1")

"Parallel Sysplex Performance: tuning tips and techniques,"
Kelley, Joan (IBM, Poughkeepsie, NY), SHARE 86, February 1996.